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# Novozymes use of patents

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## Introduction

- Preben Rasmussen,
  - Department Manager for EnzymeBusiness-patents –DK
  - Civilingeniør 1988, DTU
  - Ph D 1991, DTU
  - European Patent Attorney 2004
- Joined Novozymes in 2006

## Introduction

- Novozymes is the World leader in Bioinnovation
  - World largest producer of industrial enzymes
  - Provides enzymes, ingredients to biopharmaceutical industry, microorganisms and biosolutions
  - Headquarter in Bagsværd, Denmark
- Have more than 1,000 patent families
  - (a patent family is a group of patents and patent applications having same priority application)
  - More than 6,000 patents and patent applications

## Organisation

- Patent department integrated in R&D
  - We find it beneficial that the patent attorneys are close to the inventors
- In house Patent functions in different countries
  - Denmark, USA, China, UK and India
  - Co-located with R&D
- We use external patent agents in other countries
  - Most countries require local representative

## Novozymes innovation

### Innovation is the key to our business

- R&D continuously strive to create new and better products
  - Improved functionality give better prices
  - Differentiate from competitors
  - We prefer to compete on performance not on prices
  
- We invest R&D resources in developing new business areas
  - E.g. Biofuel,
  - Often in partnership with other players
  
- No "me too" products

## Use of patents

- Patent use:
  - Protects R&D investments
    - Patents are a main way to secure the values generated in R&D
  - Keep competing products away from market
    - Provide a competitive advantage for our own products
  - Grant licenses to selected technologies in selected fields
    - Provides an income for our R&D investment

## Others patent rights

- We respect others valid patent rights
  - We take licenses to third party patents
    - A way to get access to a market covered by third parties technology
    - An option if a third party patent covers our product
  - We try to invalidate patents limiting our activities
    - Mainly using patent invalidation procedures running at the patent offices:
      - Re-examinations in the USA
      - Oppositions in Europe

## Type of protection

- Patents claiming the product (Enzymes)
  - This is our favorite claim type because:
    - It covers any possession, production or use of the products
    - It is easy to enforce because you only have to document the presence of the product to show infringement
- Patents claiming a production method
  - Difficult to enforce because we need to prove that a potentially infringing product is produced using the claimed method to show infringement
  - Some production methods are not patented but kept as know how

## Type of protection

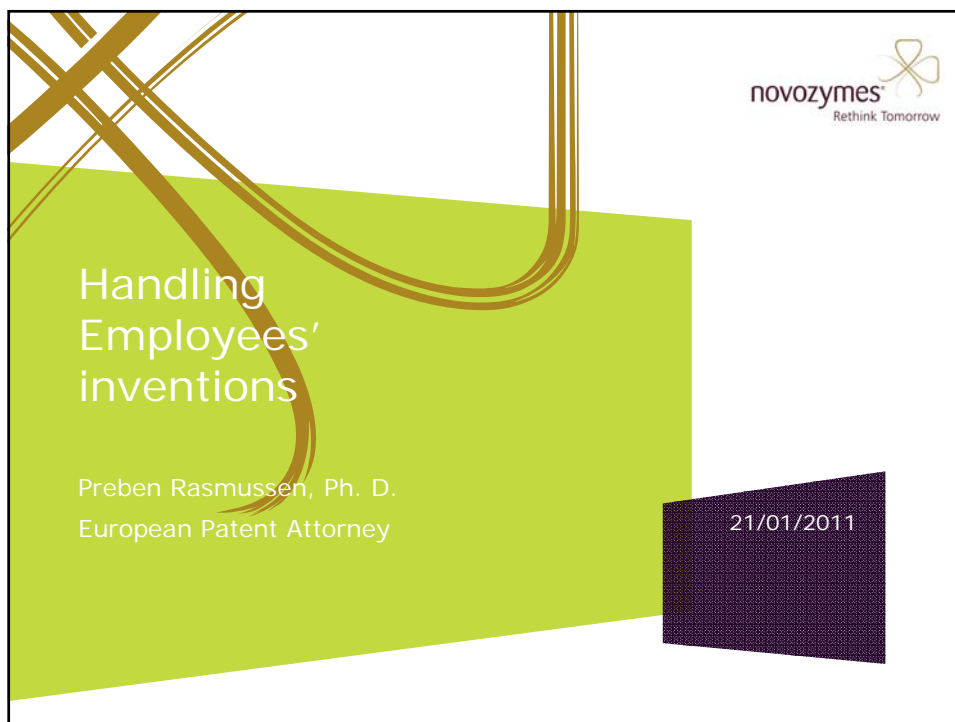
- Claims to the application/use of a product
  - Problematic because these patents covers our costumers activities
  - Customers bying our products gets license to application patents
  - In order to use such a patent against a competitor we must show that the competitor has marketed the product in question together with directions for the particular application/use
  - Each business segment decides on the use of such claims


## Activities in Patent department

- Create new patent rights
  - Draft patent applications
  - Prosecute patent applications
- Oppose or defend patent rights
  - To invalidate third party patent rights
  - To defend our patents opposed by third parties
- Secure freedom to operate for our products
  - Before launch of a new product FTO must be established
  - If problematic third party are identified we have the option of invalidting the rights or obtaining a license

## Patent enforcement

- If our patents are infringed we try to enforce our rights
  
- Litigation
  - Performed together with external Lawyers
  - Takes place in court
  - Powerful process to stop infringement
  - Requires many resources
  - Only few cases proceeds to litigation



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## Handling Employees' inventions

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- In general we patent inventions made in the company in order to protect the R&D investments
  
- We use prophylactic publication in few cases
  - Will prevent us and other to patent the subject matter
  - Only for subject matter with low value and where the prospect of obtaining a patent is not good
  
- A few inventions are not patented but kept secret
  - Only if we feel that we must divulge important information in the application and we have no opportunities of enforcing a patent

## Handling inventors and inventions in a global organization

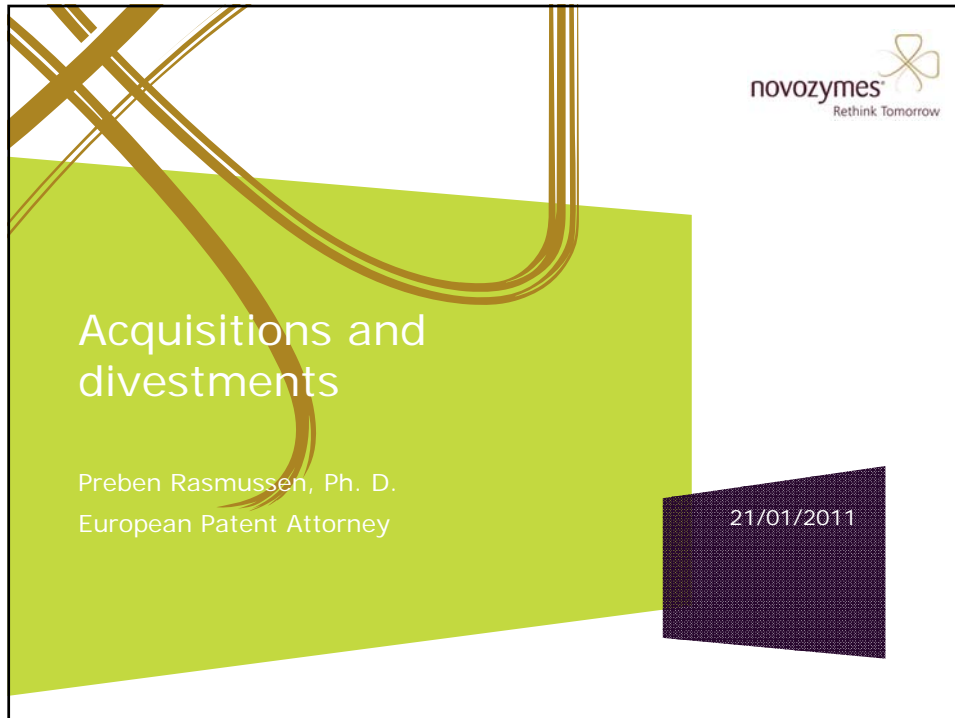
- We follow national law
  - National law determines employees basic rights
  - Employment contracts based on national law
  - Employment contracts entitles Novozymes to the rights of inventions made while working at Novozymes
  
- Conflicting national laws
  - We have many R&D projects involving different sites
  - USA, China and India all require national first filing of applications for inventions made in the countries
  - Problem for inventions made jointly by inventors located at different sites – no easy solution


## Handling inventors and inventions

- Process for drafting and filing applications
  - Inventors inform patent function of new invention
  - Patent agent and inventors agrees on patenting or not
  - Patent agent draft application with technical input from inventors
  - Priority application is filed
  - Optionally an assignment is executed
  - In the convention year the inventor supplies further data according to agreement
  - PCT application is drafted and filed 1 year after priority date
  - Optionally an assignment is executed
  - PCT application is published 18 months after priority date

## Handling inventors and inventions

- Education of staff is important for patent function
  - Increase awareness of patenting
  - Scientific staff should know when to contact patent function
- Controlling scientific publications is also part of patent function
  - Publication of an invention prevents later patenting
  - Manuscripts for scientific publications must be approved by patent department before submission to publisher



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# Acquisitions and divestments

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- We routinely scout for potential acquisition targets in order to:
  - Enter new business areas
  - Establish business in a new geographical regions
- If we decided to stop development and other activities in an area we try to divest patents and know how

## Acquisitions and due diligence

- When a potential acquisition target is identified an due diligence team is formed
  - Composition depends on the particular acquisition target but usually the team has members from Legal, finance, Patents and licensing, regulatory, R&D and production
  - The task of the team is to conduct a due diligence i.e. establish that the apparent values of the acquisition target are real values
  - Part of the task can be done with publicly available information but usually the team gets acces to confidential information in a short period

## Due diligence

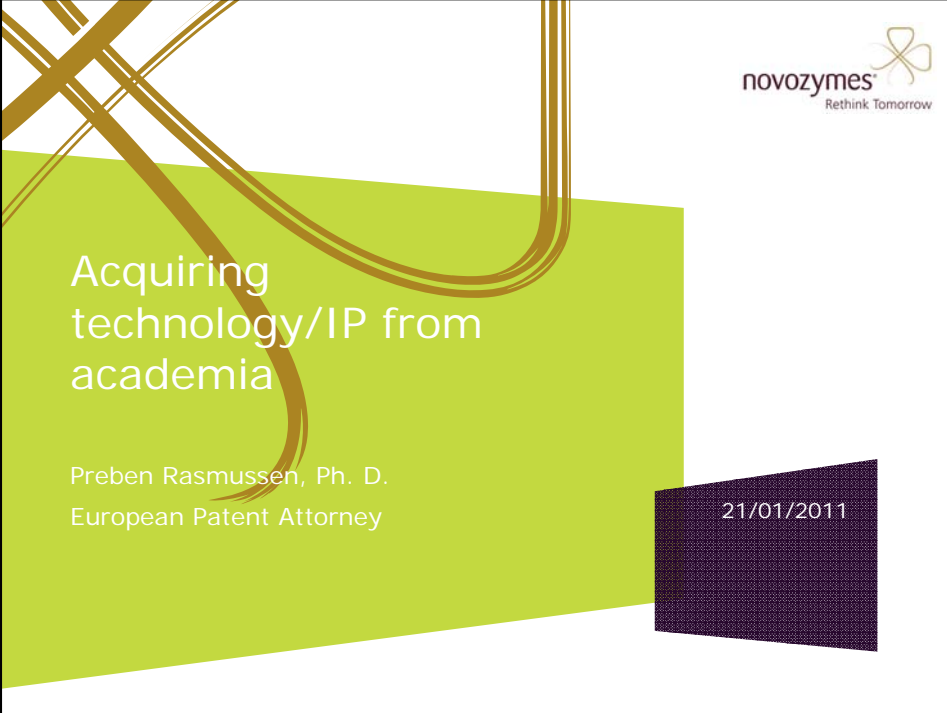
- Patent tasks in due diligence
  - Patents and patent applications
    - Entitlement to patents
    - Predicted scope of pending applications
    - Outcome of pending conflicts, oppositions etc.
  - Licenses
    - Identify licenses
    - Are license agreements valid and transferable
  - Freedom to operate
    - Is there freedom to operate for the present and intended activities


## Due diligence report

- The Due diligence ends with a report of the findings made in the analysis
  - The aim of the report is to give the best possible picture of the value of the potential target
  - The report will further mentioned any problems, benefits, risks and opportunities discovered during the process
- The report is an important element in deciding on the acquisition

## Divestment of IP

- Potential buyers are identified by the business peoples
- Patents & Licensings role is to present the IP in a fair and unbiased way:
  - We present official documents
  - We may present optional external opinions
  - We do not present our own opinion or expectations




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# Acquiring technology/IP from academia

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## Acquiring technology /IP from academia

- General schedule
  - Primary contact
    - Often R&D makes first contact
  - Business consideration
    - Do we believe that the technology/IP generates value in our set up?
  - Patent evaluation
    - Performed by inhouse patent attorney
  - Agreement

## Primary contact

- We contact academia
  - Contacts via scientific meetings or publications
  - R&D contacting academia
- Academia contacts us
  - R&D evaluates the technology
    - In existing areas
    - Potential for new areas

## Initial considerations

- R&D:
  - Does the technology/IP fit into our technology
  - How much R&D effort must we provide to develop the technology/IP to enter the market?
- Business
  - Can we see a business model where the new technology creates a revenue?

## Patent evaluation the application as such

- Evaluating the technology
  - Is the technology patentable?
  - Who has the right to the invention?
  
- Evaluating an optional patent application
  - Is it valid?
  - Is the application thoroughly drafted?
  - Is the invention broadly exemplified?
  - Is the country selection satisfactory for our needs?
  - When was the application filed, and has the technology been published?

## Patent evaluation Freedom to operate

- Freedom to operate analysis
  - Search for third party patent and applications
    - National rights must be considered in each jurisdiction
  
  - Evaluate retrieved documents
    - Evaluate scope of found patents
    - Evaluate possible scope for identified patent applications
    - Consider validity of found patent rights
  
  - Conclude
    - We can practise the offered technology
    - We can not practise the technology
      - Can we get license to blocking patent rights?

## Agreement

- Acquiring patent rights
  - Gives us the full control of the technology
  
- License agreement
  - Exclusive or not
  - May contain prosecution clause
  
- Co-development agreement
  - Often desirable a for non-mature technology
  - We prefer to patent inventions created during the cooperation

## Potential problems Ownership

- Who owns the invention:
  - University
  - students
  
- Which rights can we get and which rights will the university keep
  - We prefer to have all commercial rights to the invention
  - What can the university do with the technology?
  - Can the university use the technology in cooperations with other parties?

## Potential problems Publications

- Inherent dilemma: Academia wishes to publish; we prefer to wait to publish until the patent application has been published:
  
- General patenting time line
  - 0 Month – filing of priority application
  - 0-12 Month – optional additional priority applications
  - 12 Months – filing PCT application comprising content of priority applications and added subject matter
  - 18 Months – PCT application is published

## Potential problems Publications

- Consequence of publication:
  - Prior to Priority filing: no valid patent in many jurisdictions
  - 0-12 Months: publication is prior art for subject matter added in PCT application
  - 12-18 Months: we can not withdraw a pending patent application before publication and refile to obtain a later priority date.
  
- Possible compromise:
  - No publications allowed before filing of PCT application
  - Scientists notify us of an invention and allows us 2-6 months to file patent application covering the invention whereafter it can be published

## Potential problems valuation of an invention

- The value of an invention depend on the additional revenue generated by implementing the invention
  
- The value of an invention depends on many factors including:
  - Revenue of expected sale
  - Maturity of invention
  - Time to marketing
  - Likelihood of succes

## Value of an invention

- Revenue
  - New market
    - Sale expectations based on market analysis and business models
    - High costs connected with developping new market
    - High risk
  - Existing market
    - Sales expectations based on known market size
    - Lost sale of existing products
    - Lower risk
  - New process
    - Cost reduction can be calculated based on existing sales

## Value of an invention Maturity of an invention

- We practically never find technology ready to be marketed
- Before marketing we need to do additional research/development:
  - Expression studies
  - Production
  - Application studies
- The value depends on how much research/development we must do before the technology can be marketed.

## Value of an invention Other considerations

- Time to commercialization
- Likelihood of success
- These factors may affect the value or the structure of payment for an invention

## Structure of payments

- Up-front payment
  - Less attractive if the likelihood of success is low or the time until commercialization is long
  
- Milestone payments
  - Specified payments when certain technical or commercial goals are achieved such as expression in microorganism, registration of product, first commercial sale
  - Attractive if technical challenges are foreseen
  
- Royalty
  - e.g. payment of a percentage of sale

Questions?